ABSTRACT

An invert emulsion drilling fluid includes an oleaginous continuous phase; a non-oleaginous discontinuous phase; a biodegradable surfactant including a di-fatty acid ester of triglycerol; and a weighting agent. It si preferred that the fatty acid have the formula RCO_2H in which R is an alkyl or akenyl having 10 to 20 carbon atoms. The oleaginous fluid is selected from diesel oil, mineral oil, synthetic oil, ester oils, glycerides of fatty acids, aliphatic esters, aliphatic ethers, aliphatic acetals, or other such hydrocarbons and combinations of these and similar compounds. The non-oleaginous phase is selected from fresh water, sea water, brine, aqueous solutions containing water soluble organic salts, water soluble alcohols or water soluble glycols or combinations of these and similar compounds. The weighting agent is any suitable weighting agent and is preferably selected from water insoluble weighting agents such as barite, calcite, mullite, gallena, manganese oxides, iron oxides, or combinations of these or water soluble weighting agents such as water soluble salts of zinc, iron, barium, calcium or combinations of these and similar compounds.